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Subject: NRC Observations for TIMaSC Tabletop Exercises
Date: Thursday, June 11, 2026 2:29:00 PM
Attachments: TIMaSC - Natrium TTX NRC Observations.pdf

Brandon,

The purpose of this email is to provide you with the attached NRC observation team's feedback associated with the Technology Inclusive Management of Safety Case (TIMaSC) tabletop exercises that were held in June 2026 with Natrium.

This email along with the attached document will be added to ADAMS and the document will be made publicly available.

Please let me know if you have any questions.

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NRC Observations Associated with June 3, 2026 Natrium TIMaSC Tabletop Exercises

Purpose

The purpose of this document is to provide the Nuclear Regulatory Commission (NRC) staff observations of the second set of Technology Inclusive Management of Safety Case (TIMaSC) tabletop exercises that were held in June 2026. TIMaSC's purpose is to provide guidance on managing a modernized, risk-informed and performance-based regulatory framework for nuclear power reactor licensees, with a focus on the operational phase of reactor life cycle. The TIMaSC guidance will be applicable to licensees using the licensing modernization project (LMP) methodology, as described in NEI 18-04, Revision 1, and endorsed by the NRC in Regulatory Guide (RG) 1.233. The purpose of the TIMaSC tabletop exercises was to:

- Exercise the TIMaSC draft guidance for content, structure, and level of detail so that the guidance can be validated, and where necessary, improved.
- Develop feedback for the TIMaSC team to assist in refining the draft guidance document.
- Increase efficiency for the upcoming NRC review and endorsement of the TIMaSC guidance document by giving the NRC staff a chance to see the guidance being used.

TerraPower Natrium participated in these tabletop exercises. The following scenarios were demonstrated in the exercises:

- Scenario 1 – Updated Metal Fuel Testing Data
- Scenario 2a – Updated Generic Reliability Data – Active Intermediate Air Cooling
- Scenario 2b – Updated Generic Reliability Data – Passive Intermediate Air Cooling
- Scenario 3 – Changes to Screened Out Fuel Handling Initiating Events
- Scenario 4 – More than Minimal Increase in Design Basis Accident (DBA) Consequences

NRC and Idaho National Lab (INL) (NRC Contractor) staff observed these tabletop exercises. The following sections are the NRC and INL staff observations related to the various tabletop exercises. These observations are being provided to industry for their consideration and may be the subject of future interactions with industry on the TIMaSC guidance document.

Overall Observations

1. In scenario 1, it was noted that impacts to the emergency planning zone (EPZ) were discovered via the defense in depth evaluation. The NRC staff recommends reviewing the TIMaSC guidance document to determine if there should be any additional triggers/hooks to lead to identification of changes that can impact risk-informed programs that use PRA results and insights.
2. The staff observed that the evaluation of scenario 4 using the deterministic criteria under block 2 (of figure 8) yielded significant changes to the licensing basis (requiring a license amendment request and final safety analysis report update) and compensatory measures, while the risk-informed evaluation of the change proceeding from diamond B did not identify any risk-significant impacts. The choice to evaluate using the deterministic criteria was driven by TerraPower's assumption that there would be significant impacts to the DBA analysis. However, the decision-making process to arrive

at block 2 is not clear; it seems as though the risk-informed evaluation under diamond B could proceed in the opposite direction, without evaluating against the deterministic criteria, which could eliminate the identified need for licensing basis changes. It's also not clear if this could be affected by the interaction between the NEI 22-05 Technology Inclusive Risk Informed Change Evaluation (TIRICE) process and TIMaSC. It may be of value to provide more discussion on this decision-making process and when the deterministic route should be taken in the TIMaSC guidance document.

3. The TIMaSC guidance may benefit from additional considerations of how changes related to the state of knowledge of external hazards (e.g., new information that impacts seismic event frequencies and magnitudes) would be evaluated and dispositioned in the process. The process seems to be capable of addressing such external hazard related changes, but the evaluation and the extent of the impacts could be more complex and challenging (e.g., many different structures, systems, and components (SSCs) could be impacted). It may be useful to provide more guidance on changes that could impact several licensing basis events and SSCs and how the combined impacts would be evaluated.